

WHAT IS CLAIMED:

Subclaim
A graphite archery arrow having an elongate shaft, a fletching portion at one end of the shaft, and a tip portion at the opposite end of the shaft, the shaft comprising:

- (a) a plurality of graphite fibers longitudinally oriented along the shaft;
- (b) a plurality of graphite fibers biased to the longitudinally oriented graphite fibers; and
- (c) a binder holding together the longitudinally oriented graphite fibers and the biased graphite fibers.

2. The graphite archery arrow of claim 1, wherein the biased graphite fibers are substantially normal to the longitudinally oriented graphite fibers.

3. The graphite archery arrow of claim 1, wherein the longitudinally oriented graphite fibers have a fiber area weight of about 120 g/m².

4. The graphite archery arrow of claim 3, wherein the biased graphite fibers have a fiber area weight of about 70 g/m².

5. The graphite archery arrow of claim 1, wherein the binder is a thermoplastic epoxy resin.

6. The graphite archery arrow of claim 1, further comprising four layers of longitudinally oriented graphite fibers and two layers of biased graphite fibers.

7. The graphite archery arrow of claim 1, the shaft further comprising a parallel portion and a tapered portion.

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~~8. The graphite archery arrow of claim 7, wherein the parallel portion is adjacent the tip portion and the tapered portion is adjacent the fletching portion.~~

~~9. The graphite archery arrow of claim 7, wherein the parallel portion is about 40% of the shaft length and the tapered portion is about 60% of the shaft length.~~

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10. A graphite archery arrow having an elongate shaft, a fletching portion at one end of the shaft, and a tip portion at the opposite end of the shaft, the shaft comprising a parallel portion and a tapered portion.

11. The graphite archery arrow of claim 10, wherein the parallel portion is adjacent the tip portion and the tapered portion is adjacent the fletching portion.

12. The graphite archery arrow of claim 10, wherein the parallel portion is about 40% of the shaft length and the tapered portion is about 60% of the shaft length.

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13. A method of manufacturing a graphite arrow composed of longitudinal and biased graphite fibers and having a tapered portion and a parallel portion, comprising the steps of:

- (a) trimming a sheet of graphite fibers to produce an elongate longitudinal pattern having a portion with parallel sides and a portion with tapered sides, the pattern having an adhesive on its back side;
- (b) trimming a sheet of graphite fibers to produce a bias pattern of about the length of the longitudinal pattern and with the graphite fibers biased to the direction of the longitudinal pattern and having a width less than the width of the longitudinal pattern;
- (c) attaching the bias pattern to the longitudinal pattern with the bias pattern offset from the edges of the longitudinal pattern;
- (d) rolling the patterns onto an elongate, tapered mandrel, the pattern being attached to the mandrel by the adhesive;
- (e) covering the patterns on the mandrel with polypropylene tape;
- (f) heating the patterns and polypropylene tape on the mandrel to about 250 to 300 degrees for about 1 hour, producing a cured product;
- (g) removing the cured product from the mandrel;
- (h) removing the tape from the cured product;
- (i) sanding the cured product; and
- (j) cutting the cured product to appropriate arrow lengths.

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14. The method of claim 13, further comprising the step of putting a release agent on the mandrel before rolling the patterns onto the mandrel.

15. The method of claim 13, further comprising the step of orienting the bias pattern off-center from the longitudinal pattern so that the bias pattern does not wrap around the mandrel until one full wrap of longitudinal pattern has been applied to the mandrel.

16. The method of claim 15, further comprising the step of wrapping four layers of longitudinal pattern followed by two layers of bias pattern around the mandrel.

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